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ABSTRACT

The OCLC Interlibrary Loan (ILL) Subsystem was designed to facilitate resource sharing among OCLC participating libraries, thereby enabling libraries to expand the range of library resources available to patrons. The final report describes subsystem design and functional uses of the ILL subsystem. A functional overview explains the file, searching, record creation, and ILL response. Descriptions of design and methodology in developing the subsystem, results of testing the subsystem, and prospective field testing are presented. A bibliography, list of system error messages, and reprint of an article on the subsystem are appended. (Author/KP)

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Final Report

Project No. 475AH5Ø137

Grant No. GØØ75ØØ663

A Computer-Based Interlibrary Loan Communications Subsystem

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Ohio College Library Center

Columbus, Ohio

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IR005 344

ABSTRACT

The Ohio College Library Center's Interlibrary Loan (ILL) Subsystem facilitates resource sharing among OCLC participating libraries (over 900 libraries nationwide), thereby enabling libraries to expand the range of library resources available to patrons.

Libraries can locate potential loan items by searching OCLC's On-Line Union Catalog. The On-Line Union Catalog contains 3.1 million bibliographic records and 15 million holding symbols that identify which libraries hold a copy of each item.

Development activities encompassed software design of those components which would provide participating libraries with complete on-line control of loan transactions. The subsystem permits borrowing institutions to initiate a loan request directly to potential lending institutions, and enables lending institutions to control items currently on interlibrary loan. The subsystem also maintains records of all on-line interlibrary loan transactions. Structured programming techniques and top-down design were utilized whenever possible in the design.

The Phase 1 Interlibrary Loan Subsystem is demonstrable on OCLC's on-line simulation processor called OBMSIML, installed under the CP-V operating system.

In a subsequent project, OCLC's Phase 2 Interlibrary Loan Subsystem will include development of the capability to generate interlibrary loan activity reports and automated overdue notices. Phase 2 also will include field testing of the entire subsystem and its elevation to operational status for OCLC participating libraries.

PREFACE

Since the Cataloging Subsystem went on-line in 1971, participation in OCLC's on-line system has grown from 54 academic libraries to over 900 libraries in 46 states and the District of Columbia. Participating libraries include academic and public libraries, specialized libraries, library networks and the federal library community.

OCLC's Cataloging Subsystem permits shared cataloging among libraries and thus eliminates duplicate cataloging efforts. This is accomplished by maintaining a readily accessible On-Line Union Catalog of bibliographic holdings for the libraries. Each bibliographic record is present only once in the catalog; location symbols affixed to each bibliographic record identify those libraries which hold an item. The advantages of this design are two-fold: First, no library has to recreate a bibliographic record for an item in its library if the item was already cataloged on-line by another library. Second, and most significant for interlibrary loan transactions, every bibliographic record on the system includes a list of those libraries which hold the item.

The On-Line Union Catalog contains over 3.1 million records with 15 million location holdings. Participating libraries catalog over 200,000 books per week and the On-Line Union Catalog grows by approximately 3,000 records per day.

OCLC's on-line system will eventually include six subsystems:

1. Cataloging Subsystem
2. Serials Control Subsystem
3. Acquisitions Subsystem
4. Interlibrary Loan Subsystem
5. Circulation Control Subsystem
6. Public Services Subsystem

The Cataloging Subsystem has been operational since 1971 and the Serials Control Subsystem has been operational on a limited basis for over a year. Some Acquisitions Subsystem functions are demonstrable in house and further development is in progress. OCLC's total library concept

derives its impetus from five long-range goals. These are:

1. to increase availability of library resources to library patrons;
2. to lower the rate of rise of library per-unit costs;
3. to furnish patrons and library staff with information when and where they need it;
4. to enable patrons to receive personalized service;
5. to provide management information.

The Interlibrary Loan Subsystem brings these goals closer to realization for participating libraries and has become an integral part of the OCLC concept of library automation.

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I. INTRODUCTION

On 1975 July 1, The Ohio College Library Center received a grant from the U.S. Office of Education to develop a computerized on-line Interlibrary Loan (ILL) Subsystem on OCLC's on-line system. An automated Interlibrary Loan Subsystem would increase substantially the availability of library resources to patrons by enabling libraries to formulate, transmit and fulfill loan requests more rapidly and efficiently than is done by traditional means. In addition, an automated Interlibrary Loan Subsystem could increase library efficiency through improved record keeping and an overall reduction in time and cost associated with interlibrary loans.

During the initial development stages, OCLC formed a task force to specify the components needed to develop the subsystem. The Task Force comprised representatives from Ohio member libraries, Network representatives and OCLC project staff. Also, representatives from NYSILL (New York State Interlibrary Loan) provided OCLC with input for the subsystem development. (NYSILL is an automated message switching system which serves to route interlibrary loan requests throughout New York State.) Literature reviews were conducted to keep informed on the state of the art in interlibrary loan systems. The Project Team thereafter mapped out the software components and programming requirements. Structured system design and structured programming techniques were followed in this design phase.

The following chapters of this report detail the subsystem design and functional uses of the Interlibrary Loan Subsystem. A full Financial Status Report (OMB No. 80-R0180) is appended to the report.

II. FUNCTIONAL OVERVIEW OF THE INTERLIBRARY LOAN SUBSYSTEM

A librarian can initiate an interlibrary loan transaction when a library patron requests resources not available in the local library. OCLC's Interlibrary Loan Subsystem automates the loan transaction from the point of request to the time the borrowing library returns the item to the lending library.

Through a terminal in the library, the librarian 'logs on' to the OCLC system and enters appropriate log-on messages and authorization codes for the Interlibrary Loan Subsystem.

Message Waiting File

The subsystem displays a summary screen of the Message Waiting File specific to the library when the appropriate command is entered by the user. The Message Waiting File essentially acts as an on-line mailbox for four different types of messages: ILL request messages inform a library of the number of incoming ILL requests; ILL response messages contain responses to loan requests; ILL renewal messages contain both incoming renewal requests and responses to a library's own renewal requests; ILL recall messages contain incoming requests for loan recalls. A library can request a truncated screen for each type of pending message by entering the corresponding line number for the desired category.

It is not necessary for the librarian to take immediate action on any of the messages listed on the Message Waiting File Summary Screen. Rather, he may defer such action and directly initiate his loan request.

Search of the On-Line Union Catalog

With identifying information for the potential loan item in hand, the librarian initiates a search of

the On-Line Union Catalog in the Cataloging Subsystem to locate the item. The search can be executed through the Interlibrary Loan Subsystem so that a librarian does not have to exit that subsystem and enter the Cataloging Subsystem. Appropriate search keys are entered and upon a match the subsystem displays the record. (As in the Cataloging Subsystem, a multiple match on the search keys would retrieve a screen of truncated entries; the librarian would then choose from that screen the item which he desires for full display.) A list of OCLC participating libraries which hold a copy of the item is shown at the bottom of each bibliographic record in the On-Line Union Catalog. From this list, a librarian can determine to which libraries he will direct the loan request.

Workform Request/ILL Record Creation

Upon location of the loan item record in the On-Line Union Catalog, the librarian enters a command for the system to display an ILL workform. The workform contains the necessary bibliographic information from the previous search, transferred automatically to the workform by the subsystem. Via his terminal, the librarian enters additional order information on the workform in the appropriate fields, and enters a list of up to five potential library codes (determined from the list at the bottom of the bibliographic record). The librarian then issues a 'produce' command for the subsystem to transmit the request to the first potential lending library on the workform. At the same time the workform information becomes the ILL record for that loan transaction and is stored in the ILL Master Data Base until the loan transaction is completed.

Interlibrary Loan Response

The first potential lending library receives the loan request through its Message Waiting File. If the librarian at the potential lending institution can fulfill the request, he completes the necessary fields in the record (effectively updating the record), and initiates the procedures to send the item to the borrowing library. The subsystem automatically notifies the borrowing library

of the loan response through the Message Waiting File.

If the first potential lending library has responded negatively to the loan request, the system will send the request on to the second potential lending library, and so on. If four days have passed without a response to a loan request by a library, the subsystem automatically advances the loan request to the next potential library on the list.

The ILL record is held in the ILL Master Data Base while the item is on loan. During this time, the borrowing library may request a renewal from the lending library, or the lending library may recall the loan item. These transactions are transmitted to the appropriate library through the Message Waiting File. When the lending library receives the item back from the borrowing library, the record of the loan transaction is completed. The system deletes the record from the Master Data Base and writes a copy to the archive file.

Summary

Flow charts of the functional Interlibrary Loan Subsystem are presented in Figures 1 - 9. Detailed functional specifications for the subsystem are attached to this report.

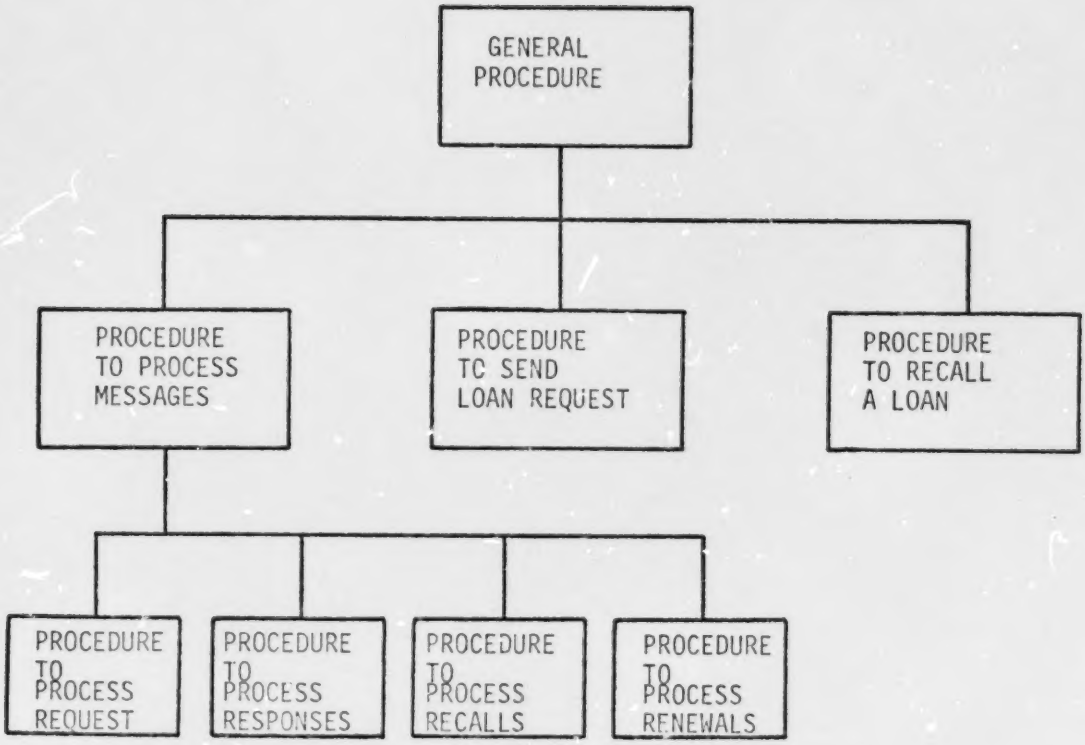
GENERAL PROCEDURE
PROCEDURE TO PROCESS MESSAGES
PROCEDURE TC SEND LOAN REQUEST
PROCEDURE TO RECALL A LOAN
PROCEDURE TO PROCESS REQUEST
PROCEDURE TO PROCESS RESPONSES
PROCEDURE TO PROCESS RECALLS
PROCEDURE TO PROCESS RENEWALS

Figure 1: TABLE OF CONTENTS FOR USER WORKFLOW ON OCLC's INTERLIBRARY LOAN SUBSYSTEM

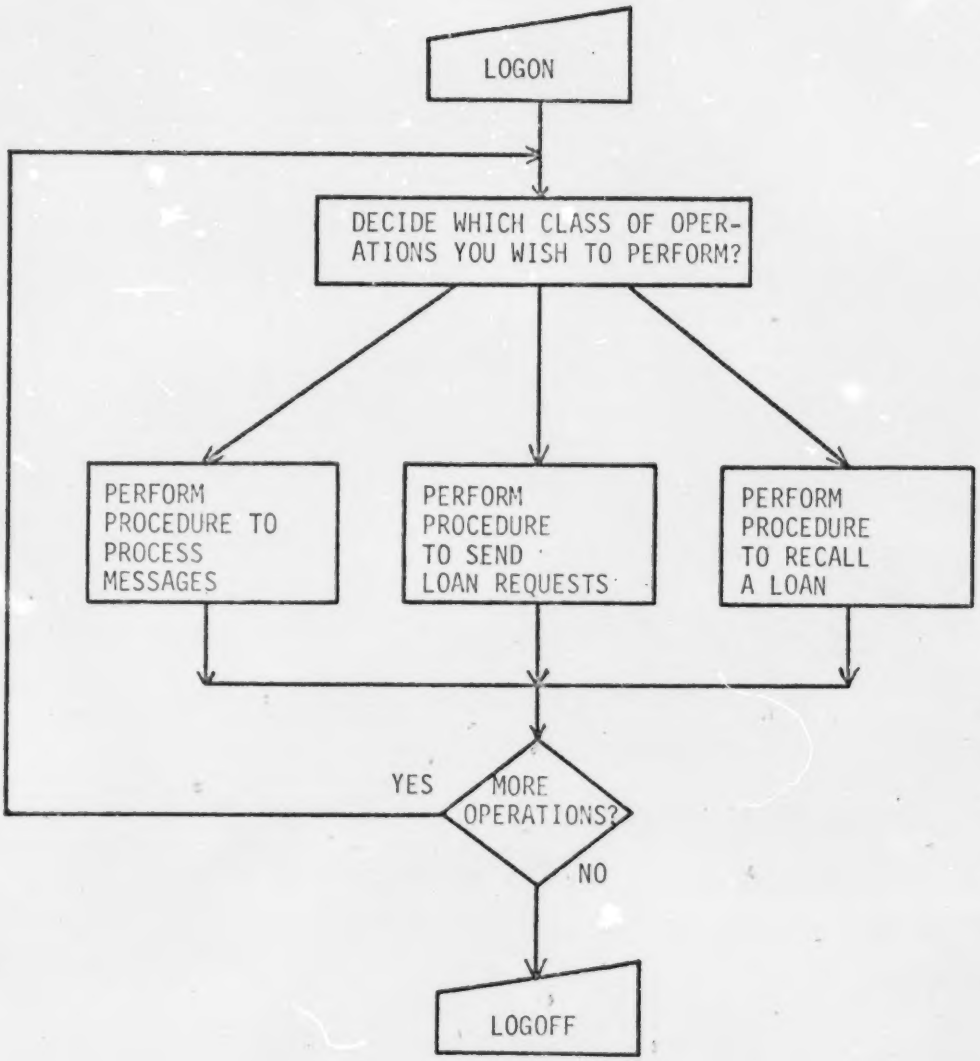

Figure 2: GENERAL PROCEDURE

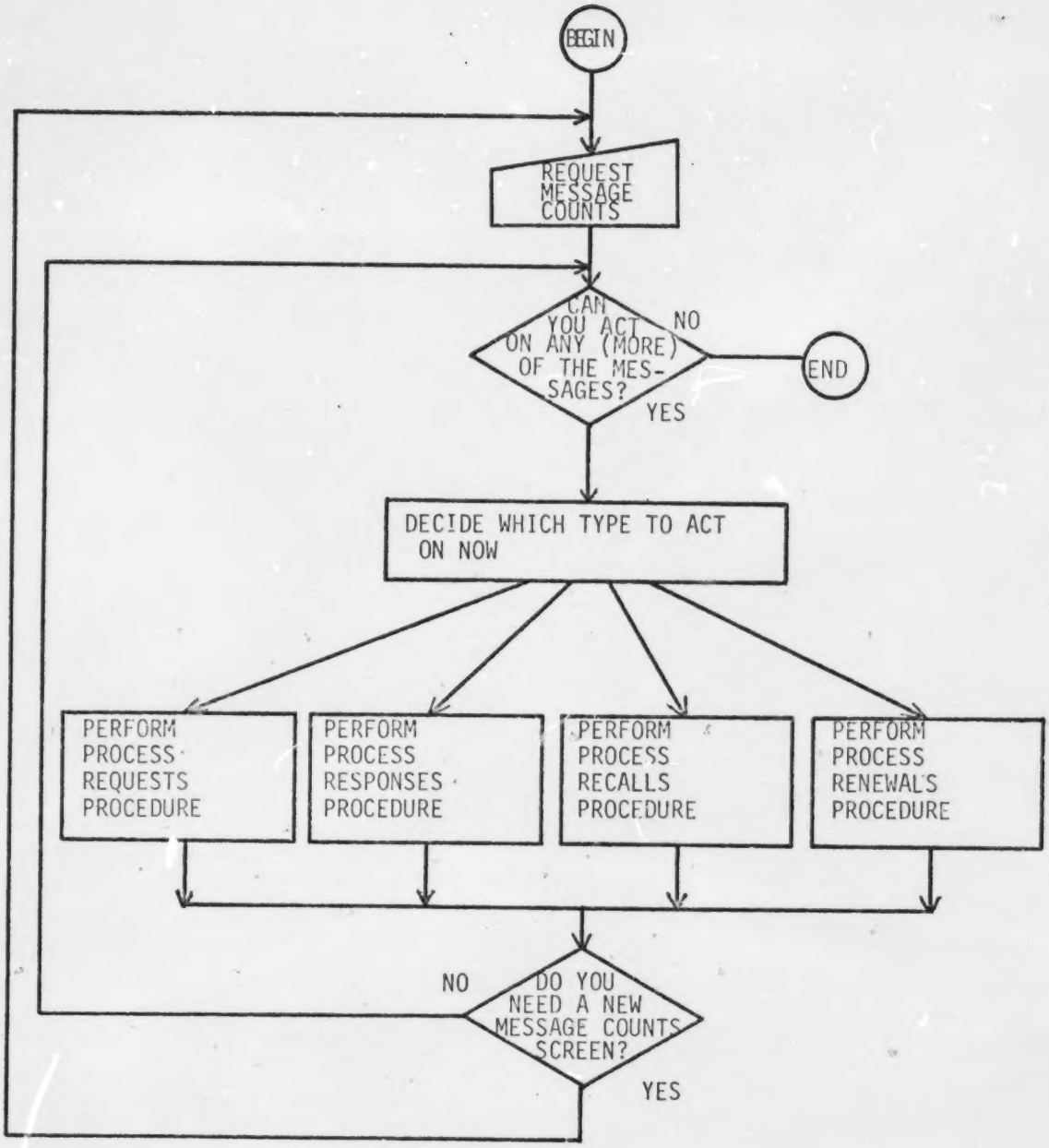

Figure 3: PROCEDURE TO PROCESS MESSAGES

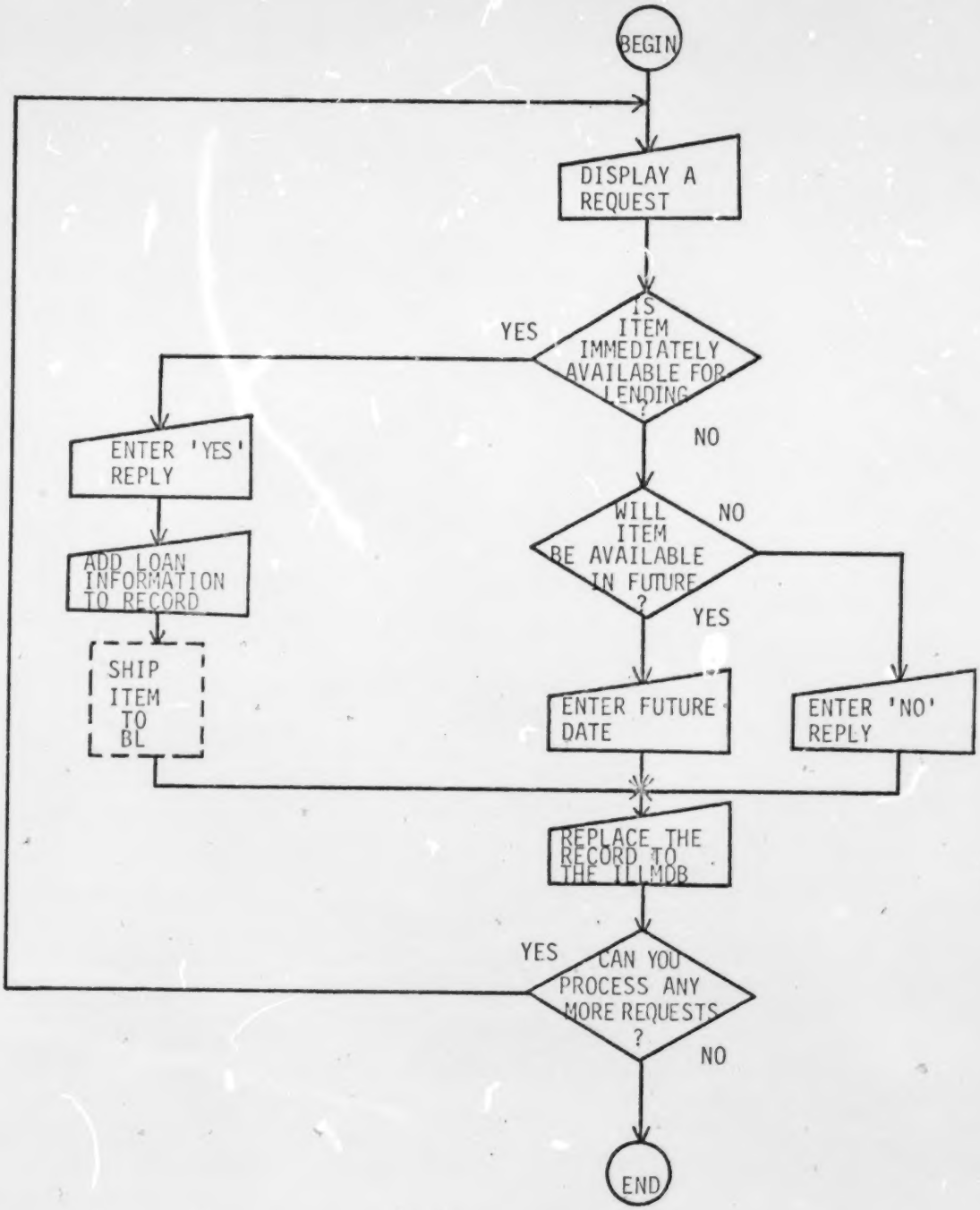

Figure 4: PROCESS REQUESTS PROCEDURE

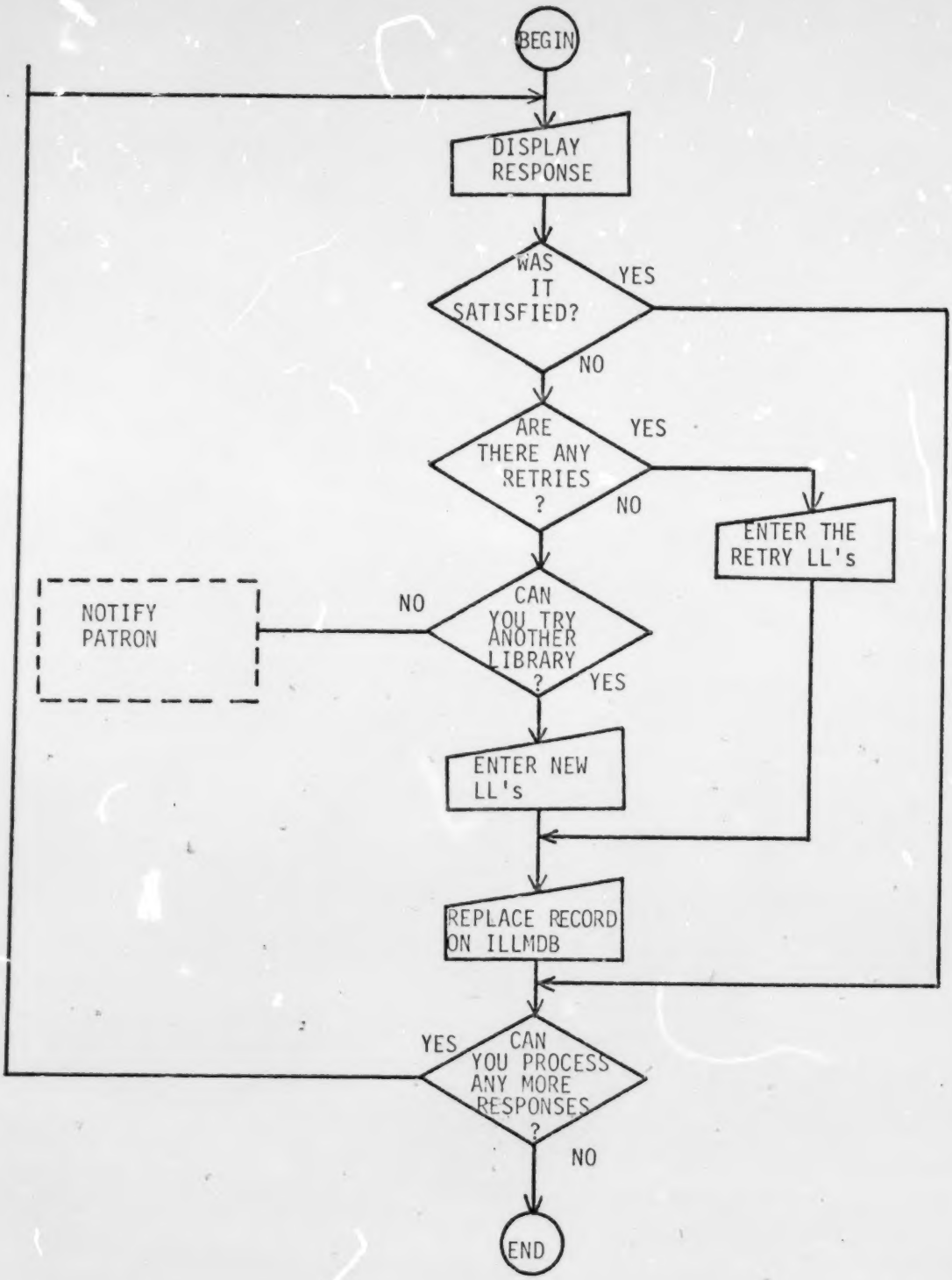

Figure 5: PROCESS RESPONSES PROCEDURE

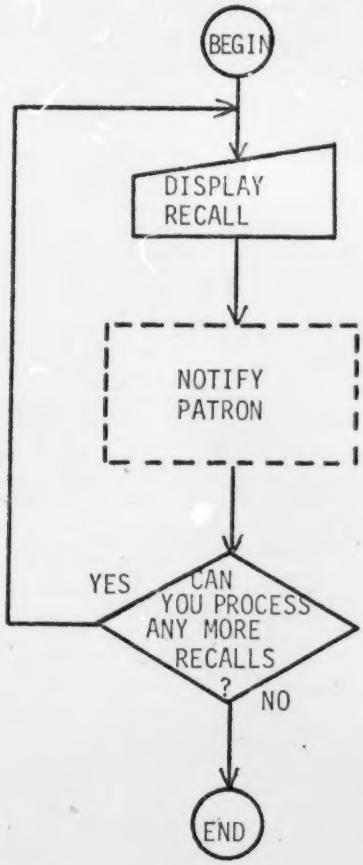

Figure 6: PROCESS RECALLS PROCEDURE

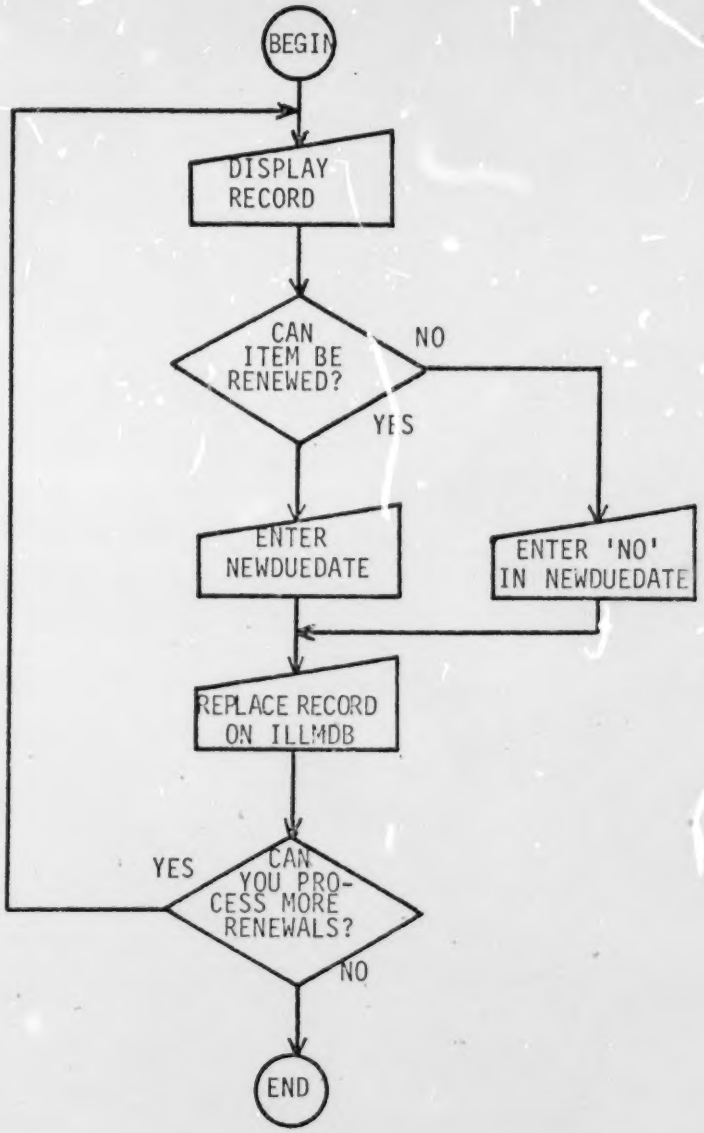

Figure 7: PROCESS RENEWALS PROCEDURE

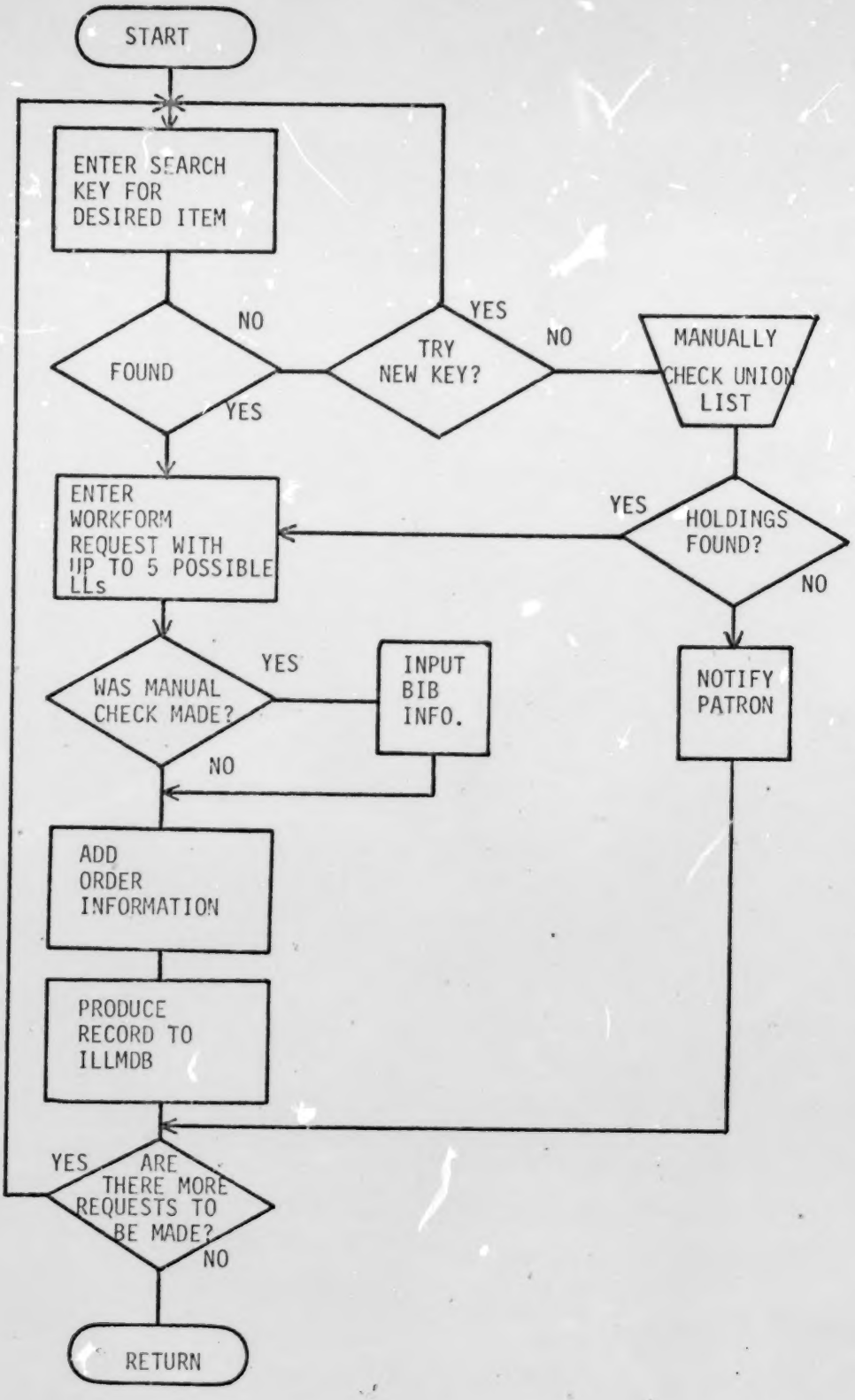

Figure 8: PROCEDURE TO SEND LOAN REQUEST

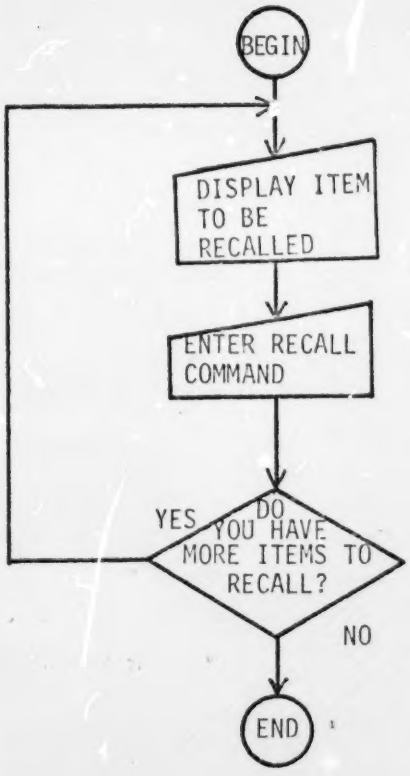

Figure 9: PROCEDURE TO RECALL A LOAN.

III. DESIGN AND METHODOLOGY

During the initial project design phase, the Project Team defined ten general areas of development associated with the Interlibrary Loan Subsystem. These areas included:

1. A comprehensive literature survey of the state of the art
2. Travel to existing interlibrary loan installations
3. Conceptual/general system design
4. Design and development of index and data files
5. Design and development of a subsystem controller
6. Design and development of screen formats
7. Design and development of internal records
8. Design and development of message formats
9. Design and development of pending message displays
10. Design and development of truncated displays

All initial software design specifications were derived from the Task Force and Project Team input.

Literature Survey and Installation Visits

OCLC conducted an extensive survey at the beginning of the project to identify any existing work in the field which might be applicable to OCLC's project. After several months of research, the Project Team concluded there was little data which could be related directly to the development of an Interlibrary Loan Subsystem at OCLC. Those resources which were to some extent helpful during the design project are listed in Appendix A.

During initial development phases, OCLC staff visited NELINET, Ohio University and The Ohio State University. NELINET designed a local interlibrary loan system to interface with their local cataloging system. Both Ohio University and the Ohio State University libraries have interlibrary loan systems, the former with transactions conducted by U.S. mail and the latter with transactions transmitted via teletype. In addition, OCLC staff

visited NYSILL, The New York State Interlibrary Loan System to review with them their intra-state interlibrary loan subsystem. Representatives from NYSILL also served on OCLC's Interlibrary Loan Task Force.

Conceptual/General System Design

The Interlibrary Loan Subsystem design incorporates current concepts of software engineering referred to as "Structured Systems Design". Three basic phases of structured systems design relate directly to the project. These are: logical design, physical design, and coding/testing.

The Interlibrary Loan Subsystem functional specifications (attached) constitute a logical design of the subsystem, as viewed by the user. During the logical design phase, the Task Force was especially prominent in order to represent the user's point of view.

The physical design phase involved mapping the logical design to the physical system. Specifications were produced for program modules in terms of data inputs/outputs, output formats, screen designs, and processes necessary to execute the subsystem functions.

The coding and testing phase permitted the Project Team to verify the physical design; i.e., the physical design was translated into code and the programs were tested. Separate driver routines were designed for some of the modules to permit testing and verification before integration with other modules in the subsystem.

Design reviews were performed periodically during the project so errors could be detected at an early stage and modifications could be made.

In that structured systems design is an iterative process whereby the phases may cycle, any design modifications reinitiated the entire cycle of structured design beginning with logical design.

Structured system design in part reflects on OCLC's internal documentation procedures for software development whereby the following documentation was prepared at applicable points in the project:

*Problem Definition
*General Specifications
*Detailed Specifications
*Data Structure Definition
*Data Content Definition
*File Structure Definition
*Display Definition
*Software Documentation
*Object Deck(s)
*Source Module(s)

Copies of the documentation are available from OCLC upon request.

Index and Data Files

The Interlibrary Loan (ILL) Subsystem accesses and processes the following files:

1. On-Line Union Catalog
2. ILL Master Data Base
3. Message Waiting File
4. Index Files

Software interface programs were designed to enable ILL Subsystem users to access the On-Line Union Catalog through the ILL Subsystem so that a user would not have to exit the one system and enter the other to search the catalog. While bibliographic records in the On-Line Union Catalog are used to identify potential lending libraries and create ILL records, a user cannot add bibliographic records to the On-Line Union Catalog through the ILL Subsystem.

ILL records are stored in an ILL Master Data Base to permit on-line status maintenance of the records. These records are accessible on-line throughout the life of the transaction. Once a transaction is completed, the final record is written to a Daily Journal File archive disk.

All existing index files used for searches of the On-Line Union Catalog are available to the ILL Subsystem. In addition, new index files were designed for searches of the ILL Master Data Base. Figure 10 illustrates the relationship among files in the ILL Subsystem.

An ILL Searcher Component was designed to handle all file searches for the subsystem. The component was designed to be as modular as possible so that all common routines may reside in public areas used by other subsystems.

The main Searcher Component ILLSRCH was designed to determine the type of search being initiated. ILLSRCH receives a search message from the ILL main program (ILLMAIN) and parses the message. The parse results is a branch to the appropriate routine to generate a search key with which to scan the index files. New key generating routines were needed only for the call number and patron name and number searches. The borrowing library, lending library, request, response, renewal and overdue searches do not generate keys; rather, they were assigned 'type' codes to be used in a sequential search of the message pointer file. If the search is for the On-Line Union Catalog, ILLSRCH will interface with the bibliographic Searcher to carry out the routine. If the search is for the ILL Subsystem, ILLSRCH will branch to the proper index file handler routine indicated in the search.

All index file handler routines use a modified CAL3,2 to search the appropriate file. (A CAL3,2 is an OCLC-written IO module that reads and writes index files for the on-line system.) The search results in either no keys matched, one key matched or multiple keys matched. The routine then exits to ILLSRCH with a return code set for whichever condition occurs.

The Message Waiting File Display routine (MWFDIS) receives control after a user enters a 'mf' command. MWFDIS then formats and displays the counts from the institution's message counter file. Processing for this routine consists of three functions: a) indexing into the ILL Message Waiting File by the institution number in the SYSMAP; b) extracting the desired counts from the ILL Message File; c) inserting these counts into a screen, formatting the screen and writing it out. (See Figures 11 and 12).

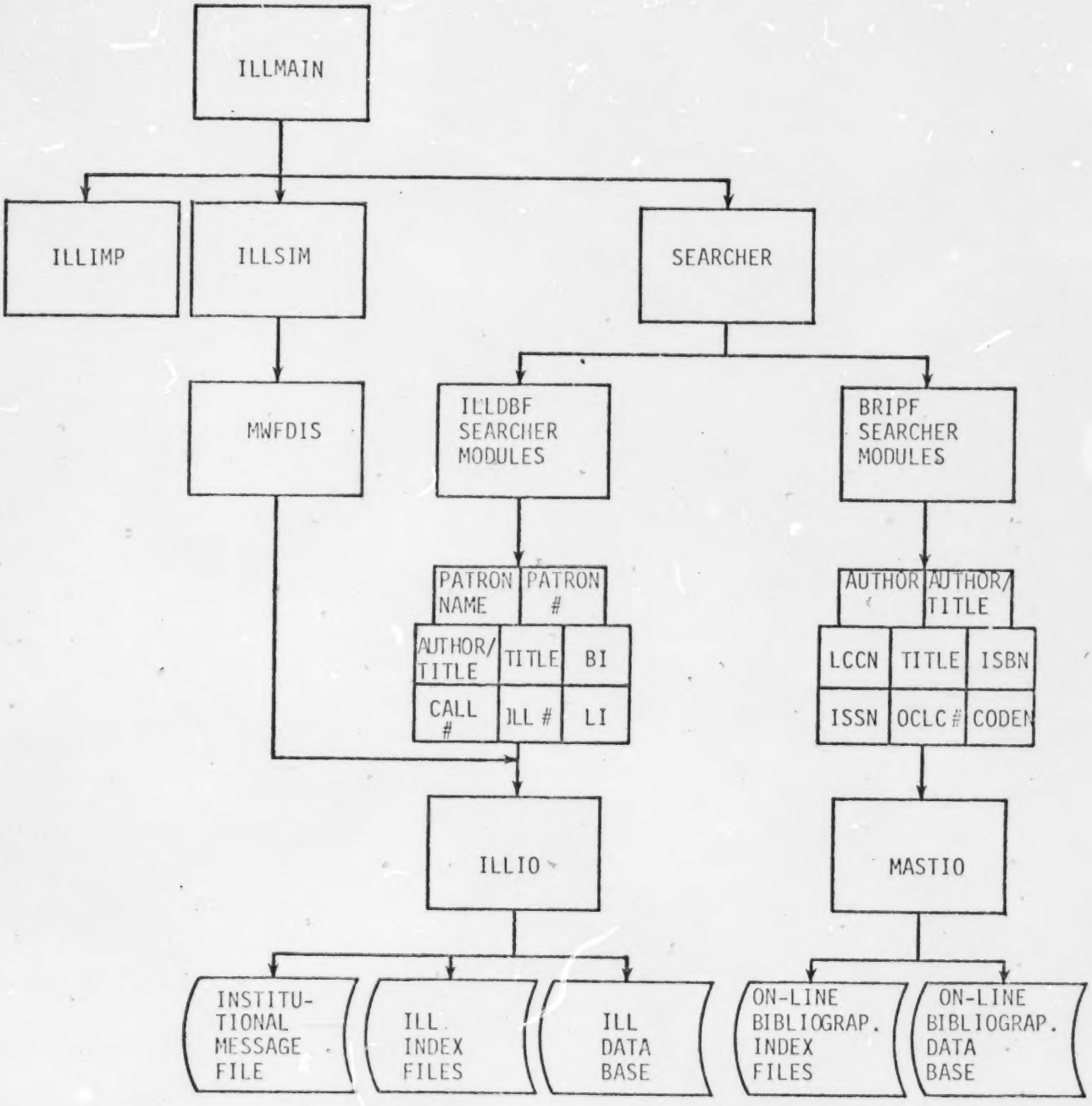

Figure 10: RELATIONSHIP AMONG INTERLIBRARY LOAN SUBSYSTEM FILES

```
The following messages are in your Message Waiting file: ¶
¶
> 1 10 ILL Requests
> 2  5 ILL Responses
> 3  5 ILL Renewals
> 4  2 ILL Recalls
```

Figure 11: Response to Command to View Message Waiting File Screen. (mf command)

```
ILL Responses: ¶
¶
          ILL#    STATUS¶
¶
>  1    23456    SHIPPED ¶
>  2    35678    RETRY 77Ø2Ø3 ¶
>  3    75969    UNFILLED ¶
>  4    98654    EXPIRED ¶
>  5   109374    SHIPPED ¶
```

Figure 12: Message Waiting File Truncated Screen

MWFDIS interfaces on the top with the ILL Screen Image Manager (ILLSIM) which will be discussed in detail further in this chapter. MWFDIS saves the registers from ILLSIM and restores them on return to ILLSIM.

ILL Main Component

The ILL main component (ILLMAIN) was designed for use as a control point in execution flow of subsystem processing. State checking and initialization take place in ILLMAIN with control then passed to the appropriate processing modules. Control is passed to ILLMAIN by the system dispatcher after it has determined the incoming message is intended for ILL.

When a message is sent to ILLMAIN, a Message Processor parses the message, assigns it an index value to be used by ILLMAIN, and checks its validity against the state table. Control then is returned to ILLMAIN which calls the appropriate processing module. All Cataloging Subsystem supporting routines used by the Interlibrary Loan Subsystem were referenced within the subsystem with appropriate branches to them. All routines belonging to the Serials Control Check-In System and used by Interlibrary Loan were incorporated into the subsystem.

ILL Record/ILL Workform

The ILL record forms the basis for all processing in the subsystem and includes request and response information for loan transactions. The ILL workform builds and formats the ILL record through user input information and bibliographic information. The system formats the workform into internal record structures and supplies default information such as status, request date, etc. Figures 13 and 14 illustrate the ILL workform and an ILL record.

```
ILL:                Borrower:          ReqDate:          Status:
OCLC:               >NeedBefore        RecDate:          RenewalReq:
Lender:                                DueDate:          NewDueDate:      ¶
>1  CALLNO:              ¶
>2  AUTHOR:              ¶
>3  TITLE:               ¶
>4  EDITION:             ¶
>5  IMPRINT:             ¶
>6  ARTICLE:             ¶
>7  VOL:              NO:              DATE:             PAGES:           ¶
>8  VERIFIED:            ¶
>9  PATRON:              ¶
>10 SHIP TO:             ¶
>11 BILL TO:
>12 SHIP VIA:                          MAXCOST:                           ¶
>13 BORROWING NOTES:     ¶
>14 LENDING CHARGES:                   DATE SHIPPED:     SHIP INSURANCE:  ¶
>15 LENDING RESTRICTIONS:          ¶
>16 LENDING NOTES:                 ¶
>17 RETURN TO:                     ¶
>18 RETURN VIA:                    ¶
>19 RETURNED VIA:                      RETURNED DATE:    INSURANCE:       ¶
```

Figure 13: ILL Workform Display

```
ILL:      236     Borrower:OCL       ReqDate:77Ø72Ø     Status:PENDING
OCLC:  185738      NeedBefore:        RecDate:           RenewalReq:
Lender:  *oun,fnp                     DueDate:           NewDueDate:      ¶
>1   CALLNO:                ¶
>2   AUTHOR:  Calderon de la Barca, Frances Erskine (Inglis) ¶
>3   TITLE:  Life in Mexico, during a residence of two years in that country ¶
>4   EDITION:               ¶
>5   IMPRINT:  Mexico, Ediciones Tolteca, 1952 ¶
>6   ARTICLE:               ¶
>7   VOL:         NO:                   DATE:             PAGES:    ¶
>8   VERIFIED: OCLC ¶
>9   PATRON:  Smith, Henry/staff ¶
>10  SHIP TO:  Corporate Library/OCLC/1125 Kinnear Rd./Columbus, OH 43212 ¶
>11  BILL TO:  Same ¶
>12  SHIP VIA:                        MAXCOST: 3.00 ¶
>13  BORROWING NOTES:           ¶
>14  LENDING CHARGES:              DATE SHIPPED:     SHIP INSURANCE:   ¶
>15  LENDING RESTRICTIONS:     ¶
>16  LENDING NOTES:            ¶
>17  RETURN TO:                 ¶
>18  RETURN VIA:                ¶
>19  RETURNED VIA:                 RETURNED DATE:    INSURANCE: ¶
```

Figure 14: Sample ILL Record

An ILLWFR processing module manages the flow of control for the workform and record creation. The basic structure and flow of ILLWFR is composed of: 1) initialization; 2) processing of bibliographic record if present; 3) building a skeletal record; 4) formatting the workform; 5) a return sequence. At initialization, certain fields are set in the record and the following fields are supplied by the system: ILL (control number); Borrower (borrowing library); ReqDate (date of request); Status and OCLC (control number).

If a bibliographic record for a loan item was found in the On-Line Union Catalog, ILLWFR isolates the author, title and imprint fields for insertion in the workform. A bit then is set to indicate the record was verified by OCLC.

At this point in processing, a non-contiguous ILL record exists in the system with its fields scattered and referenced. ILLWFR calls the processing routine which formats a new ILL Master Data Base Record. The fields are assembled into a contiguous record and a new directory to the record is built.

Once the contiguous record is built, ILLWFR can format the workform screen for display to the user. Fixed and variable length fields are included, with a check first made on variable fields to determine if bibliographic information is available.

Update Component

The ILL Update Component (ILLUPDAT) provides the user with the capability to maintain, create and delete ILL request records on-line in the Master Data Base File. Software in the component insures that all subsystem index files associated with the ILL transaction are updated simultaneously with the record.

ILLUPDAT determines the type of action to be performed, examines the user's current processing status and validates the user's authorization code.

Once ILLUPDAT receives processing control from ILLMAIN, it depends heavily upon the subsystem context area for input information.

There are two basic actions within ILLUPDAT. These are: 1) a create function, in which the user creates a new ILL request record; 2) an update function in which a user may update an existing request or response, or delete an entire record.

With a create function, the component retrieves the user input information from the user's context area and performs a field-by-field edit of the data. If the data are valid, the context area record information is restructured into an ILL internal record format. Modified IO routines then add the record to the Master Data Base and update all index files. Finally, ILLUPDAT updates the Institution Message Pointer and Institution Message Control Files to reflect the new record.

With the update function, ILLUPDAT retrieves the existing record from the user context area and, after all valid updating and reformatting, returns the record to the Master Data Base. All appropriate files are updated to reflect the change. In both of the above functions, copies of the record are written to the Daily Journal archive file.

Screen Image Manager

The Screen Image Manager (ILLSIM) controls all subsystem modules which display screen images. Control is established through a processor index which directs ILLSIM to the appropriate processing module. ILLSIM not only formats and displays all screens required by the ILL Subsystem but keeps track of the screens for recall of previous screens and display of subsequent screens.

The following action codes and routines were developed in ILLSIM:

WFS	Display workform
PREVS	Display previous screen
ILLNS	Display next screen
MFW	Display message waiting file
GETMASTR	Display bibliographic record
FSCROUT	Display screen
REFORMTI	Reformat current ILL record

ILLSIM effectively isolates the incoming action code and thereafter branches to the desired routine for processing. Output consists solely of a screen.

ILLWFS calls the workform screen routine. Both the 'previous screen' and 'next screen' routines exist in the Cataloging Subsystem with ILLNS executing a state check to intercept the bibliographic record. MWF calls the routine MWFDIS to display a user's message waiting counts. GETMASTR reads the ILL Master Data Base or the bibliographic file for a master record. This routine was designed in two parts, one for each file. FSCROUT actually writes out the screen; although this routine exists in the Cataloging Subsystem, software was transferred to the ILL Subsystem with additional software designed to accommodate ILL records. REFORMTI uses several external routines to reformat ILL records. These routines reorder the variable fields, initialize the screen work areas, perform actual formatting of the screen image, complete formatting and write the screen image to the user's terminal.

Message Handler

The ILL Message Handler Waiting Module outputs all subsystem messages that inform the user of the status/completion of his previous input command.

The module receives and formats two different types of messages: those requiring fill-in information such as the addition of a date or institution code; and those needing no fill-in information. Within the former group, those messages include the following, where 'aaa' is the institution code and 'nn' is the field name:

aaa non-ILL user
aaa illegal symbol
aaa will supply
ILL#_____supply
ILL#_____sent
ILL#_____updated
ILL#_____recalled
ILL#_____deleted from Message Waiting File
Field nn added
Field nn deleted
Field nn replaced

Within the latter group, those messages output by the system include:

Request impossible
Loan request canceled
Message not clear
Loan transaction completed
Message added
Renewal request sent
Renewal response sent
Your future date has been recorded.
Thank you.
Retry acknowledged
More than 5 LL's entered
Illegal data
Illegal line no.
Invalid code
Fixed field updated
ILL request has been deleted from your message waiting file.

Appendix B presents a detailed summary of the subsystem error messages and user actions.

Summary

Overall design considerations and methodology remained consistent throughout the project. There were several points during the project where design and methodology was altered, not to reflect functional changes but rather to facilitate use of the system, and bring the design more in line with the Cataloging Subsystem.

A complete modular diagram of the Interlibrary Loan Subsystem is presented in Figure 15. This figure illustrates the flow of control and interface among the modules in the subsystem.

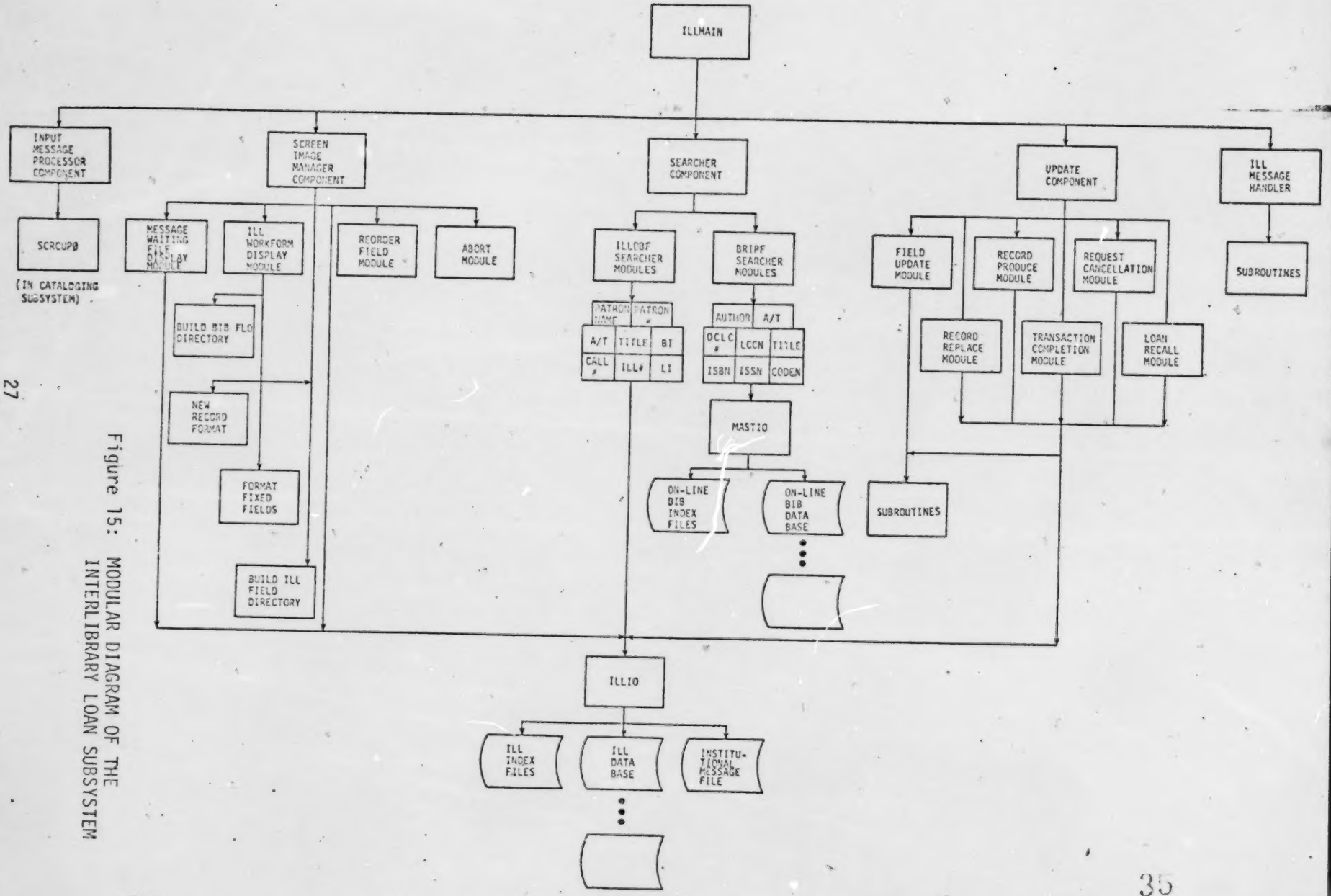

Figure 15: MODULAR DIAGRAM OF THE INTERLIBRARY LOAN SUBSYSTEM

IV. RESULTS

OCLC's Interlibrary Loan Subsystem is demonstrable in-house on the CP-V operating system simulation processor called OBMSIML. Due to several recent design changes, some modules must undergo final modifications.

A major subsystem change involved the elimination of the Special Message Component. After extensive inquiry of participating libraries, OCLC determined that the Special Message feature would be used for two main purposes: to ascertain costing information and to send out recall notices.

Costing information can be supplied in the ILL request record in the form of maximum cost values the borrowing library will pay and actual charges the lending library will levy. To permit borrowing libraries to "shop around" for potential lending libraries through transmission of special messages cannot be justified in terms of overhead.

A loan recall capability, however, is a realistic benefit to libraries, but this capability alone could not justify the extensive programming efforts necessary to develop a Special Message capability. Therefore, a 'recall' Status was added to the ILL request record. When the Status field is set to 'recall', a library can check items on recall via the Message Waiting File.

These changes necessitated not only additional programming efforts but several design meetings and thus delayed completion of the Phase 1 Interlibrary Loan Subsystem. Coding changes effected by elimination of the Special Message feature include: the main controlling program; the message parser; workform displays; the new record builder; reformatting programs; the update component; screen image manager; and the message handler.

During the entire project, functional specifications were revised several times and submitted to OCLC management for modifications and final approval. Some of the changes requested by management entailed significant design changes and thus inadvertently contributed to project delays. The workform displays specifically underwent

major revisions to bring them more in line with those in the Cataloging Subsystem.

A test data base was designed on OBMSIML in which ILL request records could be created, searched, processed and deleted using a mock network. This mock network included various terminal "installations" throughout the Research and Development Division at OCLC. All phases of record processing were tested and the results proved to be correct.

Field testing of the Phase 1 Interlibrary Loan Subsystem will follow the same test pattern described above, with approximately 25 libraries participating in the test.

V. PROJECT CONTINUATION

OCLC currently is seeking support for its Phase 2 Interlibrary Loan Subsystem. This project will include development of a Statistical Reports Component and an Overdues Component. In addition, the Referral Capability developed in the Phase 1 Interlibrary Loan Subsystem project will be enhanced to an Automatic Referral Capability where the system will determine which libraries should receive the loan request.

Field testing of the Phase 1 Interlibrary Loan Subsystem will begin during the subsequent project, with the Subsystem operational by the end of the project.

VI. DOCUMENTATION/PUBLICATIONS

During the project period, two ILL Project Team members were asked to give presentations on OCLC's Interlibrary Loan Subsystem at the American Library Association convention. In addition, an article was written and published in the T-P SMOKE SIGNAL newsletter put out by the El Paso Major Resource Center (Vol. VII, No. 4, July/August, 1976). A copy of the article is included in Appendix C.

OCLC prepared a draft users manual in September, 1976 and distributed it to several OCLC participating libraries for their comments and input. A copy of the users manual is appended to this report.

Documentation was maintained for all phases of the project, in adherence with OCLC's internal documentation standards.

Copies of this documentation were included in the quarterly reports for the quarter in which they were prepared.

APPENDIX A:

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APPENDIX B:

System Error Messages

TO	PROJECT CODE	LEVEL
R & D ILL File	JØØØ	
FROM Phyllis V. Bova	**DATE** 77Ø3Ø1/rev. 77Ø531	**REVIEWED BY**
SUBJECT System Error Messages	**REF**	**PAGE** 1 of 2

SYSTEM ERROR MESSAGES

Text of Message	User Action Resulting in Message	User Action After Receipt of Message
Illegal data	User entered undefined data in a field, e.g., alpha characters where only numerics are permitted.	Refer to User's Manual for correct data. Enter valid data and send altered field to computer.
Illegal line no.	User sent field with a line number greater than 19 or sent a field with a decimal line number.	No action necessary. Field will automatically drop from record when a reformat command is entered or when a PRODUCE or UPDATE is performed on the record.
Message not clear	User input a command or request that the system cannot interpret as a valid command or request.	Verify in User's Manual that correct punctuation and syntax is being used, and then re-enter command or request.
More than five lending libraries entered.	User entered more than five OCLC symbols in the LENDER element of the ILL record form command.	Delete additional symbols the LENDER element and send the altered field. In the case of the workform command, enter the command again followed by a maximum of five OCLC symbols.
XXX Illegal symbol	User input undefined OCLC symbol in one of the following positions: Lender element of ILL record Following the ILL Workform Command	Enter a defined OCLC symbol and send the field or workform command again.
XXX Not ILL user	User entered a symbol of an OCLC participating library that is not an ILL participant	Enter a different OCLC symbol and send the field or workform commant again.

ISSUED BY	APPROVED BY	FILE
Phyllis V. Bova	35 43	

TO	PROJECT CODE	LEVEL
R&D ILL File	JØØØ	
FROM	**DATE**	**REVIEWED BY**
Phyllis V. Bova	77Ø3Ø1/rev. 77Ø531	2 of 2
SUBJECT	**REF**	**PAGE**
System Error Messages		

SYSTEM ERROR MESSAGES

Text of Message	User Action Resulting in Message	User Action After Receipt of Message
Request impossible	User attempted to perform an illegal transaction, e.g., send a change to a system-controlled field.	Refer to section of User's Manual describing procedure being performed at the terminal.

ISSUED BY	APPROVED BY	FILE
Phyllis V. Bova	36 44	

TO	PROJECT CODE	LEVEL
R&D/ILL File	JØØØ	
FROM Phyllis V. Bova	DATE 19770720	REVIEWED BY
SUBJECT System Information Messages/ILL Subsystem	REF	PAGE

SYSTEM INFORMATION MESSAGES

Text of Message	User Action Resulting in Message
Can you supply? >Yes >No >Future date:	This message displays on the first line above the ILL record each time the record is retrieved by a potential lending library until the library responds "yes", "no", or enters a "future date".
Field "n" added (where n = field number)	User input data in a field that previously contained no data and sent field to the computer.
Field 'n' deleted	User removed all data from a field and sent the blank field to the computer.
Field 'n' replaced	User entered or corrected data in a field that already contained data, and sent the altered field to the computer.
Fixed field updated	User entered or corrected data in the fixed field of the ILL record and sent the field to the computer.
ILL# nnnn recalled	Lending library has retrieved an ILL record and has entered the "recall" command.
ILL# nnnn sent (where nnnn = ILL control number)	Borrowing library completed the ILL workform and transmitted the request by depressing PRODUCE and SEND keys.
ILL# nnnn updated	Lending library completed the appropriate fields in the ILL record and transmitted record back to borrowing library by depressing UPDATE and SEND keys.
ILL# nnnnnn has been deleted from your Message Waiting File	Potential lending library responded "no" to the question "Can you supply?"
ILL request canceled	Borrowing library retrieved ILL request and canceled the loan by entering "cancel" and depressing UPDATE and SEND keys.

ISSUED BY	APPROVED BY	FILE
Phyllis Bova		

FUNCTIONAL SPECIFICATIONS

TO	PROJECT CODE	LEVEL
R&D/ILL File	J000	
FROM: Phyllis V. Bova	DATE: 19770720	REVIEWED BY
SUBJECT: System Information Messages/ILL Subsystem	REF	PAGE

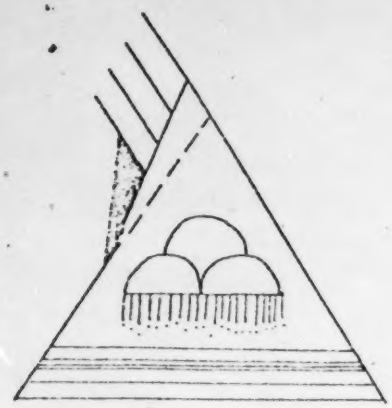
SYSTEM INFORMATION MESSAGES

Test of Message	User Action Resulting in Message
ILL transaction completed	Lending library retrieved ILL record and acknowledged return of loan item by entering "complete" and depressing UPDATE and SEND keys.
Renewal request sent	Borrowing library entered data in "Renewal Req" element of ILL record, sent the field to the computer and then depressed UPDATE and SEND keys.
Renewal response sent	Lending library entered data in the "NewDueDate" element of the ILL record, sent the field to the computer, and then depressed UPDATE and SEND keys.
(Search Key) is not in the (name of index) index. Please try a different search key	Operator has entered a key to search the on-line transaction file, and the key yields no matches.
XXX will supply	Potential lending library responded "yes" to the question "Can you supply?"
Your future date has been recorded. Thank you.	Potential lending library entered a "future date" in response to the question "Can you supply?"

ISSUED BY	APPROVED BY	FILE
Phyllis V. Bova		

APPENDIX C:

Interlibrary Loan
Article: T-P SMOKE SIGNAL



T-P SMOKE SIGNAL

Vol. VII, No. 4 EL PASO MAJOR RESOURCE CENTER JULY/AUGUST, 1976

FIRST ANNUAL INTERLIBRARY LOAN ISSUE

This issue of the "Smoke Signal" is admitted propaganda. It is devoted to Interlibrary Loan and is guest-edited by, yes, you guessed it, an I.L.L. Librarian!

Compiling materials for the issue proved to be a valuable learning experience for me. If there is one thing I.L.L. is not, it's static. As with most other library services, Interlibrary Loan is constantly changing: expanding, streamlining, improving. But before taking off on all these changes and improvements I've discovered, perhaps a bit of reflecting about Interlibrary Loan is in order.

I came across a set of basic assumptions regarding Interlibrary Loan in a journal article which I have paraphrased and would like to share with you:

(1.) The patron should not be penalized (with respect to lack of information resources) because of the limitations of his local library.

(2.) Verification will be the responsibility of the borrowing library. (In many borrowing libraries however, due to lack of tools, such as Books in Print, this is an impossibility.)

(3.) The local library bears the responsibility for adequately meeting the needs of it's users.

(4.) Interlibrary Loan networks must work to promote development beyond themselves. (For example, state networks should work toward multi-state cooperation and regional networks toward national.)

From RQ 13, Summer 1974, pp. 299-307. Wilcox and Marshall, "Minitex & WILS responses to access needs."

I tend to view Interlibrary Loan from my perspective; I'll bet you do the same. To help broaden our horizons, I asked three individuals who are each involved with Interlibrary Loan on different levels, state, regional and national, to submit articles for this issue of the "Smoke Signal".

First, Joe Langford, who works for the Texas State Library's Network Development Division, has written a history of Texas' interlibrary loan network, TSLCN (Texas State Library Communications Network). Mr. Langford's article begins with pre-TSLCN days and brings us up to the present.

The second guest column was written by James H. Kennedy who is the Executive Director of AMIGOS Bibliographic Council. AMIGOS is an organization of southwestern libraries whose aim is to "promote library cooperation and resource sharing". Mr. Kennedy presents an excellent outline of current Interlibrary Loan procedures and follows this with a brief description of the OCLC (Ohio College Library Center) Interlibrary Loan subsystem, which is still in the developmental stage.

The third article was written by Robert J. Coxe, Library Systems Anaylst at OCLC. Mr. Coxe presents a detailed description of OCLC's Interlibrary Loan subsystem which will truly revolutionize I.L.L. NOTE: El Paso Public Library is currently a participating library in O.C.L.C. EPPL uses the computer terminal for cataloging as well as for verification of bibliographic data (correct author, title, publisher, etc) for I.L.L. requests. Should we be fortunate enough to obtain a second terminal in the future, utilization of the I.L.L. subsystem may be a possibility.

Here's an opportunity for each of us to learn something about the wider aspects of the service we provide. Read on, and then engage in a bit of creative daydreaming about "tomorrow's" I.L.L. service. Some of your wildest ideas may become reality! Happy Interlibrary Loan borrowing - present and future!

-Juli Kaufman

*TSLCN: A NETWORK HISTORY

This year patrons in the Texas Trans-Pecos Library System will receive over 1,600 books, articles, and reference question answers through the Texas State Library Communications Network. Interlibrary loan activity in the system is up 150 percent since just last year. The network gears are working smoothly; the wheels are greased -- we're seeing an exciting information system settle into a healthy life. Library patrons have not always been so lucky.

In Texas before TSLCN, the bold or imaginative could sometimes procure materials from out-of-town libraries. In the lack of a formal system, though, very few citizens ever saw books that did not come off their own libraries' shelves.

The seeds from which TSLCN was born came out of a rising interest in library cooperation in the late 1950's and early 1960's. The Library Development Committee of the Texas Library Association produced a "Skeletal Plan for State-Wide Library Development" in 1962 which, in proposing cooperation through a systems approach, set the tone for planning an organized loan structure.

The passage of the federal Library Services and Construction Act in 1964 laid the base and provided the funds which were needed to get a network started. A survey concluded that the funds could be best used through an interlibrary loan network. TSLCN was conceived and began full operation in July, 1968.

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*TSLCN = Texas State Library Communications Network

The structure chosen was that proposed by TLA's Library Development Committee in its plan for systematizing libraries, (i.e. creating public library systems). To effect wide participation, there would be a 4-level referral hierarchy. Requests would be telephoned from Community Libraries to Area Libraries and from Area Libraries to the MRC's. (The Texas Trans-Pecos Region had no Area-sized, libraries. - Ed.) If the materials were still not located, the requests would be teletyped from the MRC's to the State Library.

The fledgling network arranged the loan of over 5,000 materials in its first 6 months. By 1969, 70 percent of the state's public libraries had used the network. Requested materials could often be very slow in arriving. All request switching was done at TSL. Searching for book locations was random and laborious.

All LSCA funds were impounded by the Nixon Administration in 1973. It looked as if TSLCN might have been a terminal 5-year experiment. But stopgap money was found, libraries made generous sacrifices, and the network hung on. A few months later the federal funds were released and the network's stability restored.

Three location devices introduced in 1973 greatly strengthened TSLCN service. The Texas Numeric Register, a union list of a portion of the books held by the MRC's and several universities, was begun. The TNR lowered the time required to locate and deliver materials by precluding many random searches and by allowing an efficient decentralization of request referral. Now the MRC's could often teletype directly to holding libraries, eliminating the time-consuming step of referring to TSL. TSL improved its own capability for rapid response in 1973 by microfilming the card catalogs of the 10 MRC's and starting a union card file as a method for continuous update.

Since 1973, TSLCN has seen mostly happy days. Volume has grown steadily. In September 1975, state funding was gained for the first time to supplement federal support.

The network was stable enough by 1975 for a major service evaluation. State funding is contingent on good performance and cost effectiveness. The network's structure and costs were studied to find the best way for fast delivery of materials at the least cost. As a result of the study's findings, the Area Library level in the referral hierarchy was eliminated. Losing the benefit of the Area Library collections would be justified by faster delivery and lowered costs. To assure fair compensation, MRC's would no longer be reimbursed at a set rate per transaction but according to their actual network costs.

Six months later, the reorganization looks successful. Texas Trans-Pecos Library System patrons' requests are reaching the State Library referral center or some other library within 24 hours -- often much faster. Libraries' faith in the loan system is growing. Through our industrious activity today, we are fulfilling the promise of a modest but building history of cooperation.

- Joe Langford
Network Development Division
Texas State Library

Parenthetically, I recently attended an A.L.A. Pre-Conference on Interlibrary Loan which was instructive and exciting. There were I.L.L Librarians present from many states, and, as you might imagine, we spent some time comparing notes on policies and procedures. I returned home extremely proud of TSLCN.. Texas' I.L.L. procedures, in comparison with many states, are not only streamlined, but downright innovative. It was an eye-opener for me to learn that some libraries still mail requests to the referral center, whereas our Size II and III libraries telephone the MRC. Also in some states, there is no location tool such as we have in the Texas Numerical Register (TNR) and these states must relay all I.L.L. requests to the central switching center; which is usually the state library. By using the TNR, Major Resource Centers can request directly from each other or universities and by-pass the Texas State Library, thereby saving the time taken in going through an intermediary.

We are indeed fortunate!

The glossary which follows should help in defining new or unfamiliar terms. Definitions marked "Ed." are my own; all other are taken from:

Sandak, Norman and Eileen
The Layman's Dictionary of Computer Terminology
Hawthorn Books, 1973.

GLOSSARY

Bibliographic data (description, identification): author, title, publisher and date. (-Ed.

Data base (bank): the complete collection of data or information. (-Ed.)

Field: a permanently designated area on the terminal's viewing screen for a particular piece of information. (For example, field 2 always shows title) (-Ed.)

Generate: initiate (-Ed.)

Logs-on: ...initiate communications with a...system. (Turn it on...type the first line, etc. -Ed.)

OCLC: Ohio College Library Center.

Online: a programming system or application that enables the user to interact directly with the computer. (In other words, the question is typed on the keyboard, and within seconds the answer appears on the screen. -Ed.)

Query: to ask a library to loan. (-Ed.)

Retrieval: the process of recovering or accessing stored material (information.) (An answer is "retrieved." -Ed.)

Subsystem: a secondary or subordinate system...

Terminal: any device capable of sending and receiving information over a communication channel. (Usually a keyboard, much like a typewriter. -Ed.)

Transaction: an Interlibrary Loan request. (-Ed.)

Transmit: send. (-Ed.)

NEW ON-LINE COMPUTER-BASED ILL SYSTEM

The AMIGOS Bibliographic Council provides to libraries in the Southwest the services and products of the Ohio College Library Center (OCLC). The OCLC data base provides, on-line, full bibliographic identification and an indication of which participating libraries hold a particular title. This data base presently contains over 2 million titles and over 3.5 million location listings, is growing larger everyday, and is a useful reference tool for inter-library loan (ILL).

Present Interlibrary Loan procedures consist of the following steps:

1. The borrowing library receives a request from one of its patrons to make an ILL.

2. The borrowing library must verify that the bibliographic data is correct.

3. A likely candidate is selected as a potential lending library and an ILL request is made of it. (This may be done by U.S. mail, telephone, or TWX).

4. The potential lending library must determine whether or not it holds the requested item. If so, it informs the borrowing library of that fact and sends the item on its way. If not, it returns the ILL request, possibly with a referral, and the borrowing library starts all over again.

OCLC is developing an on-line computerized subsystem with the following capabilities:

1. The subsystem will be an ILL communications system rather than a delivery system..

2. An ILL workform will be requested when the item in the data base has been located. The workform will display necessary bibliographic data from the master data base record.

3. The ILL request will be dispatched when the terminal operator inputs one to five institution (library) symbols to which the loan request should be sent. The system will dispatch a request to the first library listed and will try the others in sequence only after the preceding library has responded negatively to the ILL request.

4. If the library is unable to fill the request, the system will automatically refer the loan request to the next institution listed.

5. When a library has indicated that it will supply the requested item, or when all libraries holding the item have responded negatively, the system will notify the requesting library by displaying the response on their terminal.

6. Overdue and other status messages may also be sent.

The OCLC on-line ILL system is scheduled to be implemented by January, 1977. For more information, write AMIGOS Bibliographic Council, Box 688, Richardson. Texas 75080.

-James H. Kennedy
Executive Director
AMIGOS Bibliographic Council

THE OCLC INTERLIBRARY LOAN COMMUNICATIONS SUBSYSTEM

The Ohio College Library Center is developing a Computer-Based Interlibrary Loan Communications Subsystem to provide participating libraries with on-line control of loan transactions. When operational the subsystem will enable a terminal operator to generate and transmit a loan request to a potential lending library and enable the library receiving the request to respond via terminals connected to the OCLC computer system.

The subsystem's design includes an on-line file for storage of pending interlibrary loan records. This file provides the lending and borrowing libraries with faster, more efficient control of their loan transactions and speeds the location, retrieval and updating of transaction records.

The subsystem provides access to ILL records by author and title of the loan item and enables a library to retrieve records for all items on loan from or to a particular library. In addition, the lending library may retrieve the record of an item it has on loan by the local call number assigned the item; the borrowing library may retrieve its loan records by patron identification.

The design of the interlibrary loan record provides the lending and borrowing libraries with all information needed to generate, process and control a loan request. The ILL record will consist of a loan request form and a loan report form.

The loan request portion of the ILL record consists of fields for entering the description of the loan item, potential lending libraries to receive the request, patron identification, maximum charges the borrower will pay for the loan, shipping and billing addresses and miscellaneous notes about the loan.

The loan report portion of the ILL record contains information entered by the lending library including restrictions on the use of the loan item, due dates and shipping dates, addresses and instructions, charges to the borrowing library and special notes about the loan.

The subsystem provides for an automatic referral of loan requests by permitting the lending library to indicate up to five potential lending libraries that the system may query for the loan. The subsystem will transmit a loan request to one library at a time, awaiting a response before transmitting the request to the next lending library. After receiving an affirmative response, the system will cease further queries. A system message will notify the requesting library whether or not the loan request has been satisfied.

An on-line pending message file, functioning like a mailbox, will store incoming interlibrary loan messages for each library. This file will contain notices of new requests for loans, responses to loan request, overdue notifications and special interlibrary loan messages. Each time the library logs-on the OCLC/ILL subsystem the computer will display a list of pending messages for that library. Computer generated messages notify participants of loan cancellations and overdues. Another type of overdue notice indicates delay and possible loss in shipment.

The interlibrary loan subsystem will benefit participating libraries by providing faster communications of loan requests, by decreasing the time required to verify the bibliographic description of a loan request and by permitting complete and accurate records to be maintained for all loaned items. OCLC is presently completing the design phase for the new subsytem. A pilot test of the subsystem is scheduled early in 1977.

Robert J. Coxe
Library Systems Analyst
Ohio College Library Center
1125 Kinnear Road
Columbus, Ohio 43212

Hmmmmm-

When a librarian purchases a book, he/she hopes to have a user;

When a librarian borrows a book on Interlibrary Loan, he/she knows there's a user!

-a thoughtful university I.L.L. Librarian

AN I.L.L QUIZ - TEST YOUR SKILL

(Hint: Questions 3 and 10 are tricky)

1. Interlibrary loans are (a) a method of borrowing money from wealthy librarians, (b) restricted to Californians holding a graduate degree in marine biology, (c) transactions through which materials are obtained by one library from another library for the use of a library patron.

2. An I.L.L. network may be described as (a) a broadcasting company whose ratings are low, (b) beads sewn in to fishing nets, (c) a group of libraries who have agreed to share resources, using standardized procedures, to meet the information needs of their users.

3. A successful reference interview is (a) sometimes difficult, always a challenge! (b) important, (c) possible, with patience and practice, (d) all of the above.

4. When submitting subject requests, be sure to be (a) vague, (b) unclear yourself as to what your patron wishes, (c) SPECIFIC.

5. Verification means (a) checking your patron's birth certificate to see how close you came to guessing his or her correct age, (b) planning the 1977 personal holiday schedule with your library staff, (c) proving the existence of a book or periodical (etc.) by locating it in a standard verification tool such as National Union Catalog (NUC) or Books in Print (BIP).

6. The Texas Numeric Register (TNR) is (a) a comprehensive list of Texans giving their astrological lucky numbers, (b) a guide to the "numbers" racket, (c) a microfiche list, arranged by Library of Congress Call Number, which shows the holdings of the major public and academic libraries in Texas.

7. Locating means (a) settling in Fabens,(b) choosing a strategic spot for McNaughtons, (c) determining, via the TNR (Texas Numeric Register), which libraries own the needed book before requesting it.

8. The I.L.L. Librarian needs to know whether or not a request is Ineligible (I) or Eligible (E) because (a) she is curious, (b) she has a "yen" to do police work, (c) this information must appear on the request if it is referred to another library.

9. If a patron wishes to renew an Interlibrary Loan book (a) refuse, (b) discuss the matter with your staff members and then take a vote, (c) call the Interlibrary Loan Librarian (collect) who will request a renewal from the library that loaned you the book.

10. If you call the EPPL/MRC Interlibrary Loan Office (915-544-3556) frequently with requests, the staff will (a) be delighted, (b) be pleased you are promoting the service to your patrons, (c) feel confident that we are providing the "1st rate" service we hope to, (d) all of the above.

ODDS & ENDS

TEX HELP may help:

TEX HELP is a toll free telephone service in the governor's office to provide information on Texas Government to the public. The number, 1-800-292-9600, is answered from 8:00 a.m. to 5:00 p.m. on Monday through Fridays. Direct reference work is done or you may be connected toll free to the appropriate person or department.

RIGHT ON TARGET - "L.C. SCIENCE TRACER BULLETS"

The Documents section of El Paso Public Library has recently received the Library of Congress Science Tracer Bullet series. This publication, available on nearly seventy popular subjects, is designed to help readers find published material on a topic they are unfamiliar with.

Each "Tracer Bullet" includes:

---Definition or scope of topic.

---Subject headings in the card catalog under which information may be found in this topic.

---Bibliography.

---List of abstracting and indexing services useful in locating journal articles on the subject.

Marilyn returns to writing next month. My thanks to her for the opportunity to prepare this issue, and to you for letting me share it with you.

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